

Section 8-7: Systems of Inequalities

By the end of this lesson, you should be able to answer:

- How do you write a system of linear inequalities for a given graph?
- How do you graph the solution set of a system of linear inequalities?

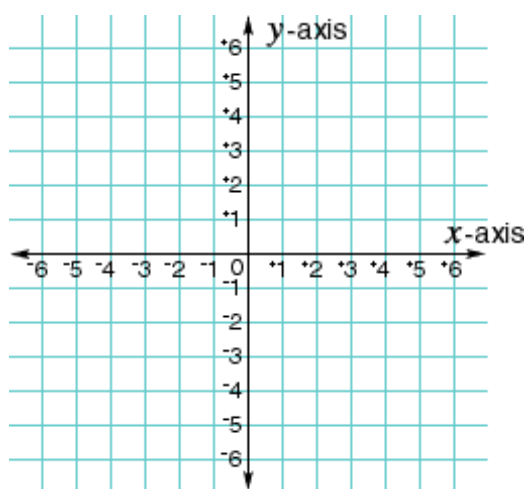
Where you might see this in the real world:

- Sports, entertainment, retail, finance

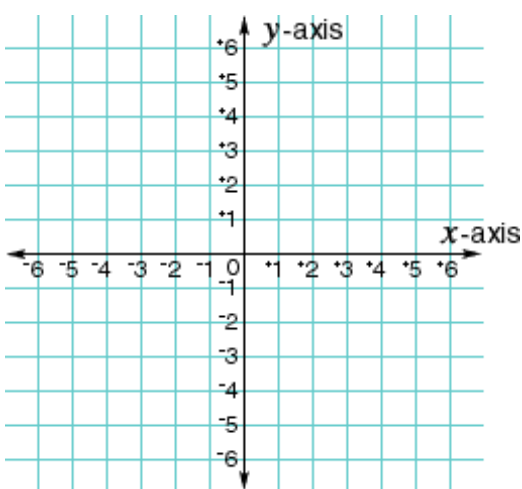
Recall back to chapter 6 when we first graphed linear inequalities. We are going to use the ideas we learned there with systems of inequalities.

Example 1: Graph the following linear inequalities on separate coordinates, then again on the same coordinates.

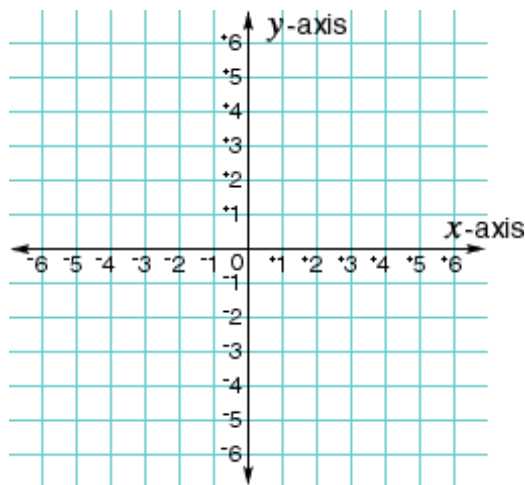
$$y < 2x + 3$$



$$y \geq -3x + 4$$



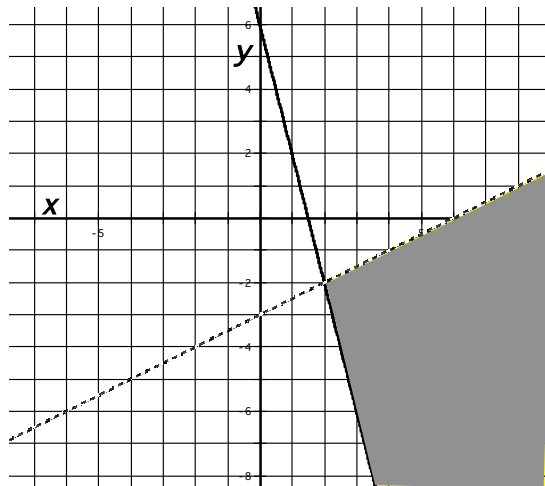
Graph both:



You will notice that there is an area on the new graph where the two linear inequalities overlap. This will be the intersection of the areas that are solutions for each. The intersection is known as the feasible set. The feasible set is the solution to a system of linear inequalities. Any ordered pair within the feasible set is part of the solution. Values on the boundaries can also be in the solution if we have \geq or \leq .

Make a list of 10 ordered pairs that satisfy this system of inequalities.

You should be able to also write out the linear inequalities from a given graph. You will want to write the linear inequalities in slope-intercept form, keeping in mind whether the boundary lines should be solid or dashed.

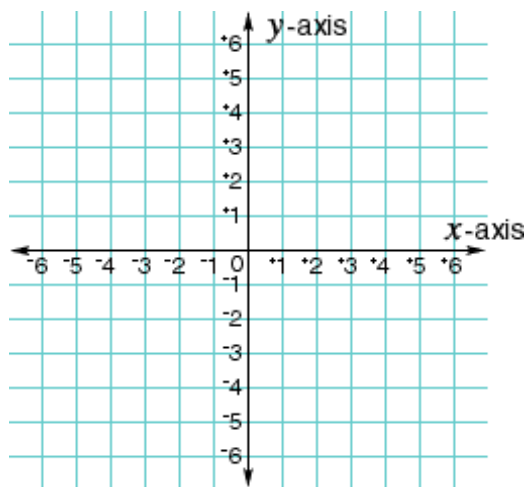


Example 2: Write a system of linear inequalities for the graph shown.

Example 3: Matt Mitarnowski was planning a wedding reception that will last at least 4 hours. The couple wants to hire a band that charges \$300 per hour and a DJ who charges \$150 per hour. They want to keep the music expenses under \$1200. The band and DJ charge by the whole hour only.

a. Write a system of linear inequalities that models this situation.

b. Solve the system by graphing.



c. Make a list of possible combinations of band and DJ hours that Matt could use for the reception.

Problem Set:

"Try to learn something about everything and everything about something."

- Thomas H. Huxley